

# Lesion-Specific Enzymes for Identifying Clustered Damages and their Substrates

Enzyme	Principal Lesion Class Recognized	Lesions Recognized <sup>1</sup>
<i>E. coli</i> formamidopyrimidine-DNA glycosylase (Fpg Protein)	Oxidized purines	FaPyAdenine, FaPyGuanine, C8-oxoGuanine, some abasic sites, C8-oxoAdenine and to a lesser extent, other modified purines (FaPy = 2,6-diamino-4-hydroxy-5-N-methylformamido-pyrimidine). [1,2,3,4,5]
<i>E. coli</i> Nth protein (Endonuclease III)	Oxidized pyrimidines	Thymine residues damaged by ring saturation, fragmentation, or ring contraction, including 5,6-dihydrothymine, thymine glycol, urea, 5-hydroxy-5-methyl hydantoin, DNA damaged at guanine sites, and some abasic sites. [4,5,6,7]
<i>E. coli</i> Nfo protein (Endonuclease IV)	Abasic sites	Several types of abasic sites, including oxidized abasic sites, abasic sites modified with alkoxyamines, and DNA containing urea residues. [8,9]

<sup>1</sup>5-hydroxycytosine and 5-hydroxy-2'-deoxyuridine are substrates for Fpg protein and Nth protein, but neither is formed at significant levels during aerobic irradiation.

1. Boiteux, et al., *J. Biol. Chem.* 265:3916 (1990).
2. Boiteux, et al., *Biochemistry* 31:106 (1992).
3. Tchou, et al., *Proc. Natl. Acad. Sci. USA* 88:4690 (1991).
4. Hatahet, et al., *J. Biol. Chem.* 269:18614 (1994).
5. Jurado, et al., *Biochemistry* 37:7757 (1998).
6. Asahara, et al., *Biochemistry* 28:4444 (1989).
7. Dizdaroğlu, et al., *Biochemistry* 32:12105 (1993).
8. Haring, et al., *Nucleic Acids Res.* 22:2010 (1994).
9. Xu, et al., *J. Biol. Chem.* 273:28837 (1998).

FIG. 1

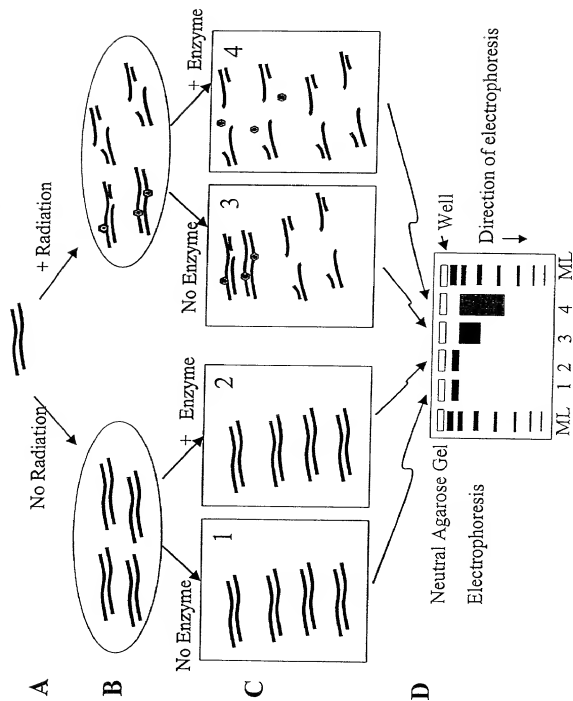


FIG. 2

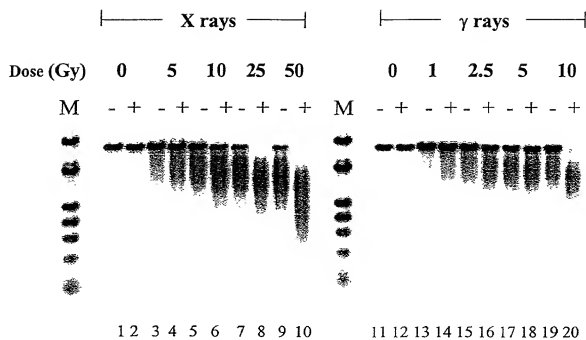


FIG. 3

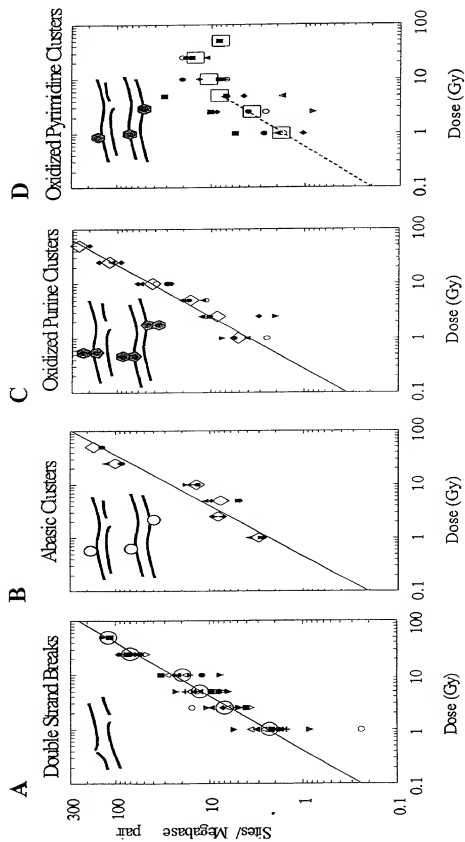


FIG. 4

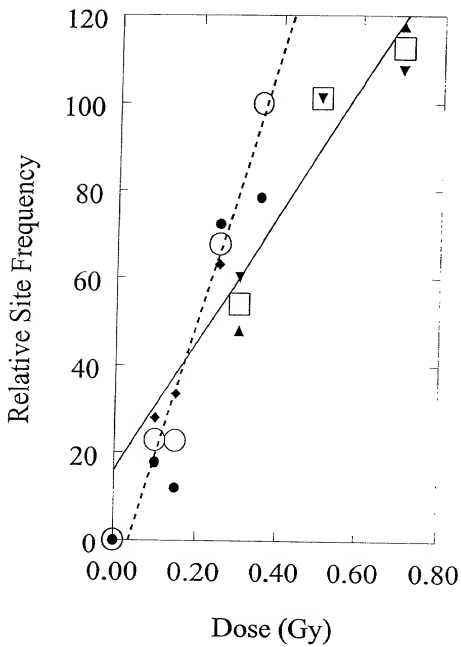


FIG. 5